

# Optical Properties of Secondary Organic Aerosols Grown from Various Precursors



Brian Barkey  
Hwajin Kim  
Suzanne Paulson

Department of Atmospheric and Oceanic  
Sciences, University of California, Los Angeles

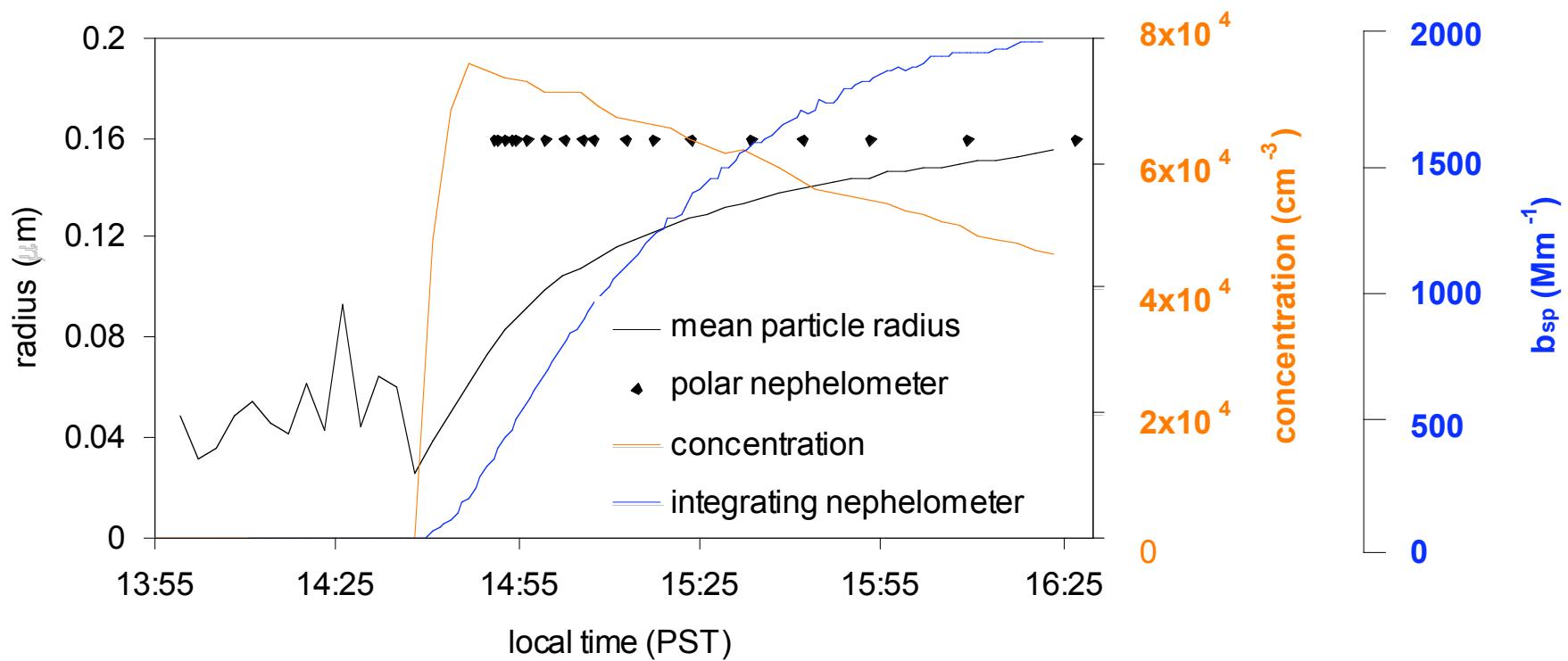
# Introduction

- Production and measured properties of  $\alpha$ -pinene and  $\beta$ -pinene SOA.
- GA determined  $m_r$  from polar nephelometer angular scattering.
- Preliminary measurements of SOA asymmetry parameter.

# SOA growth, Experimental Setup

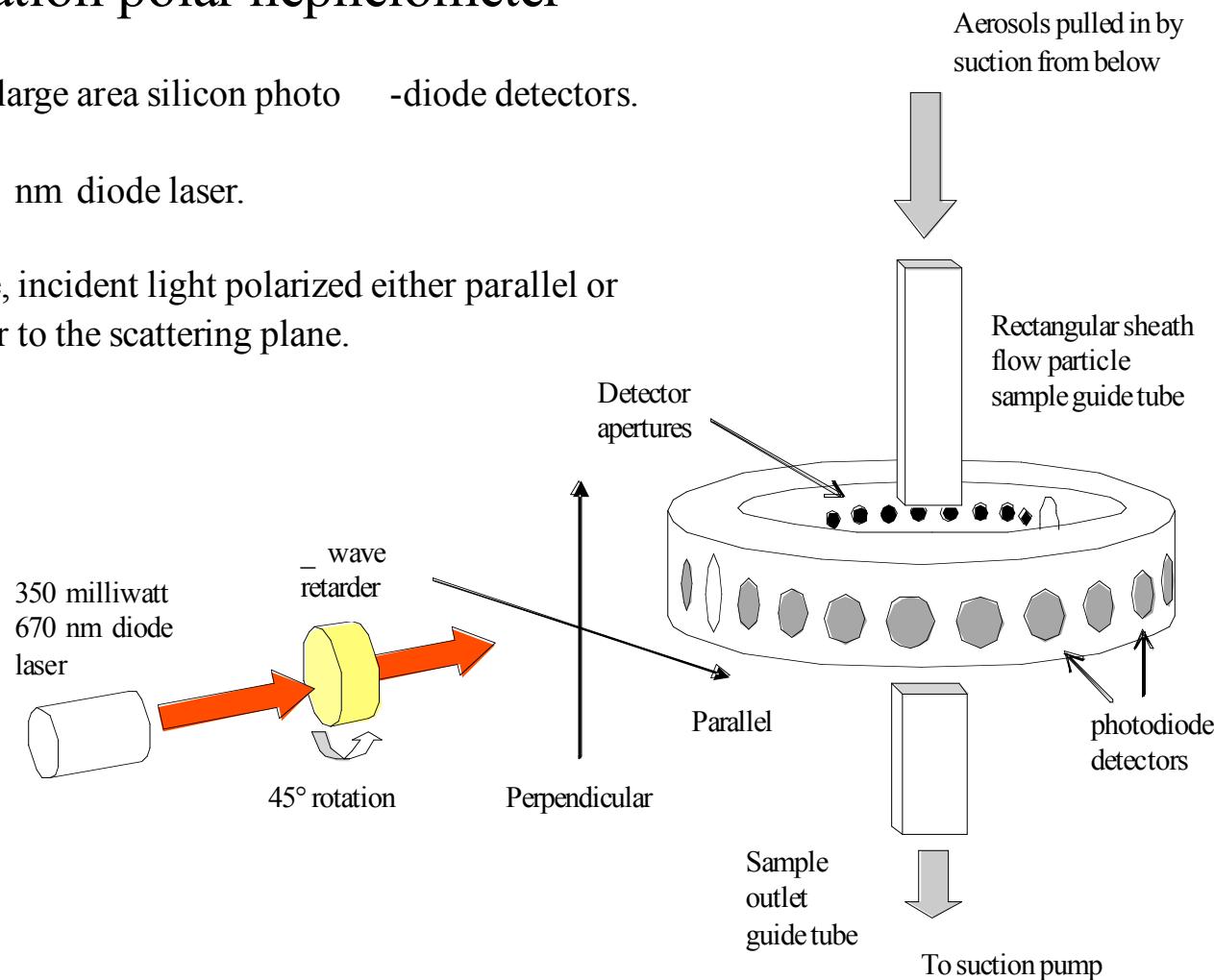


# SOA Growth, Time Evolution

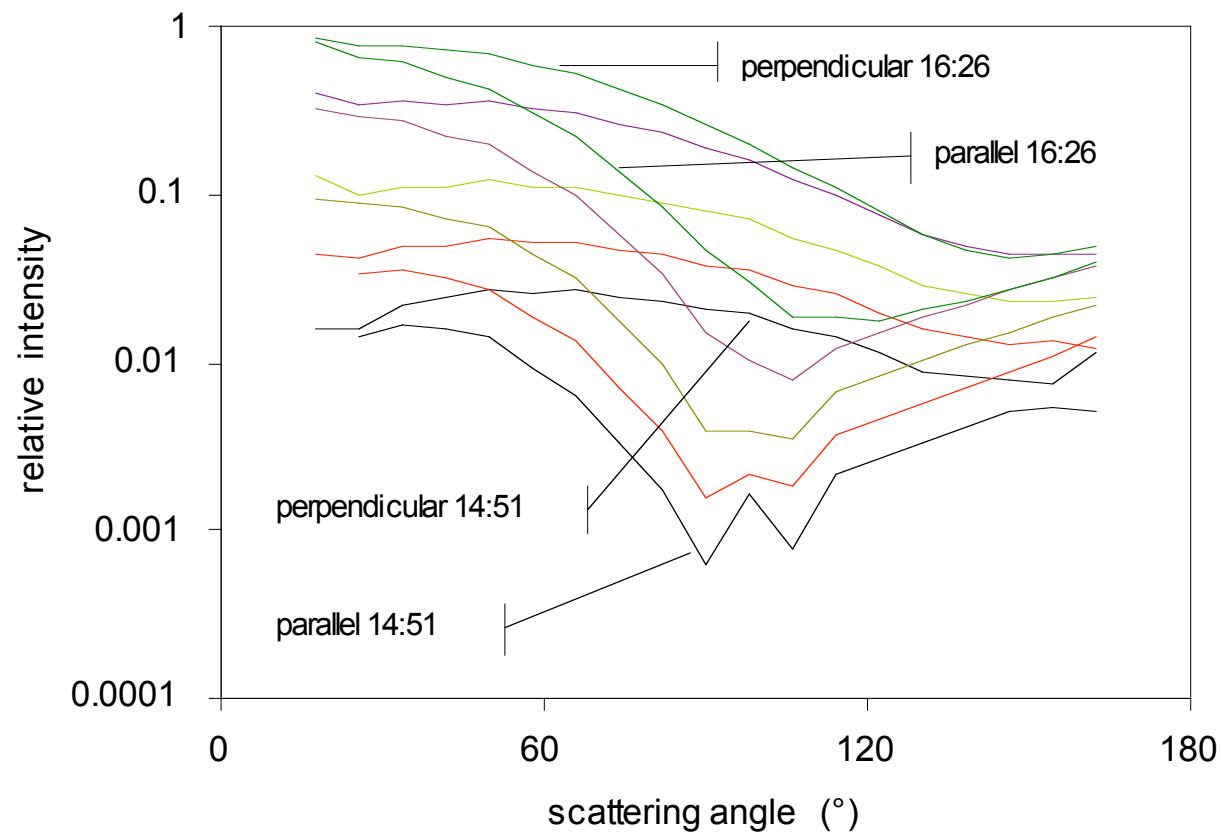


# Dual polarization polar nephelometer

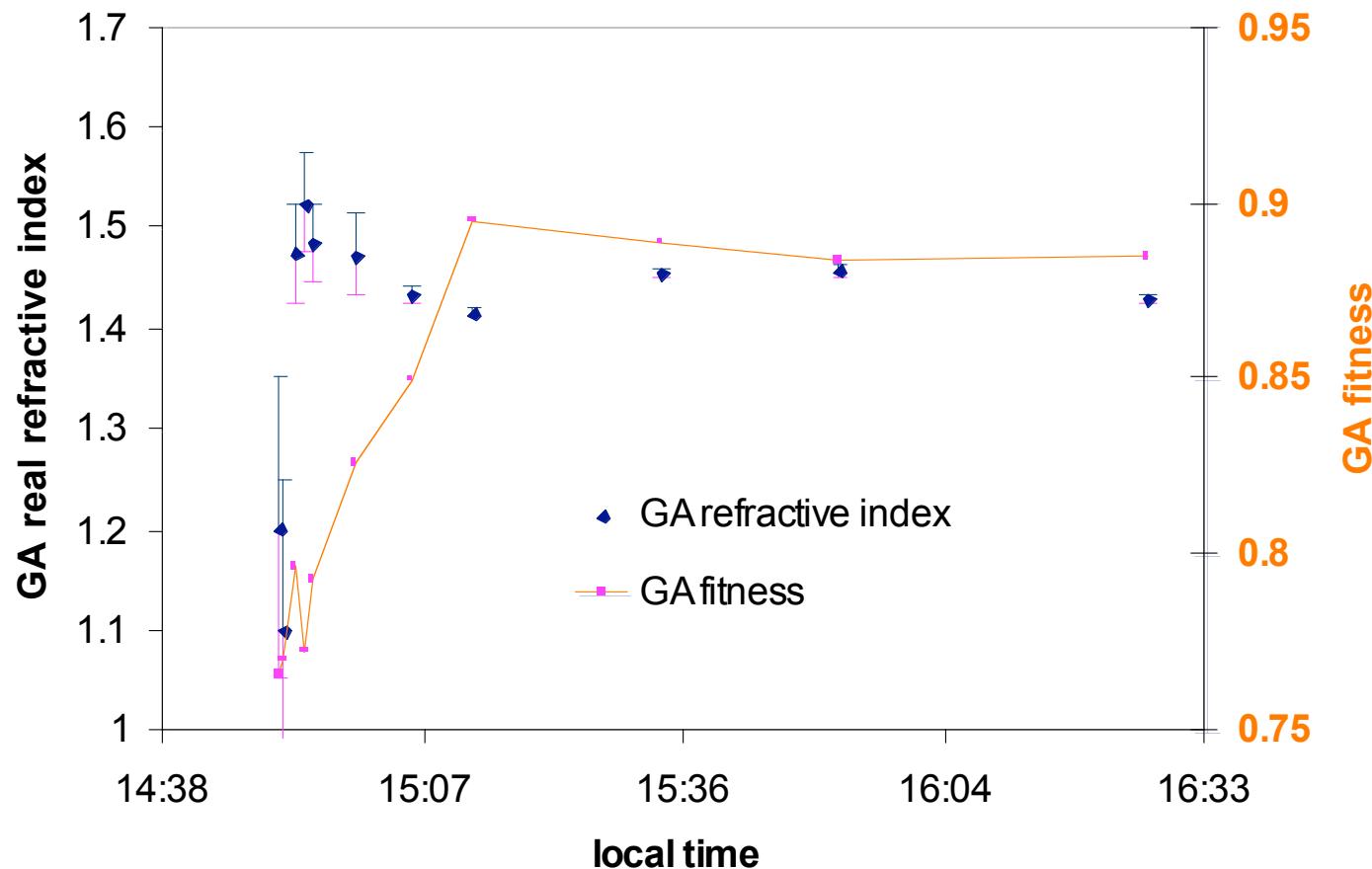
- 21 channels, large area silicon photo -diode detectors.
- 350 mw 670 nm diode laser.
- $\pm$  wave plate, incident light polarized either parallel or perpendicular to the scattering plane.



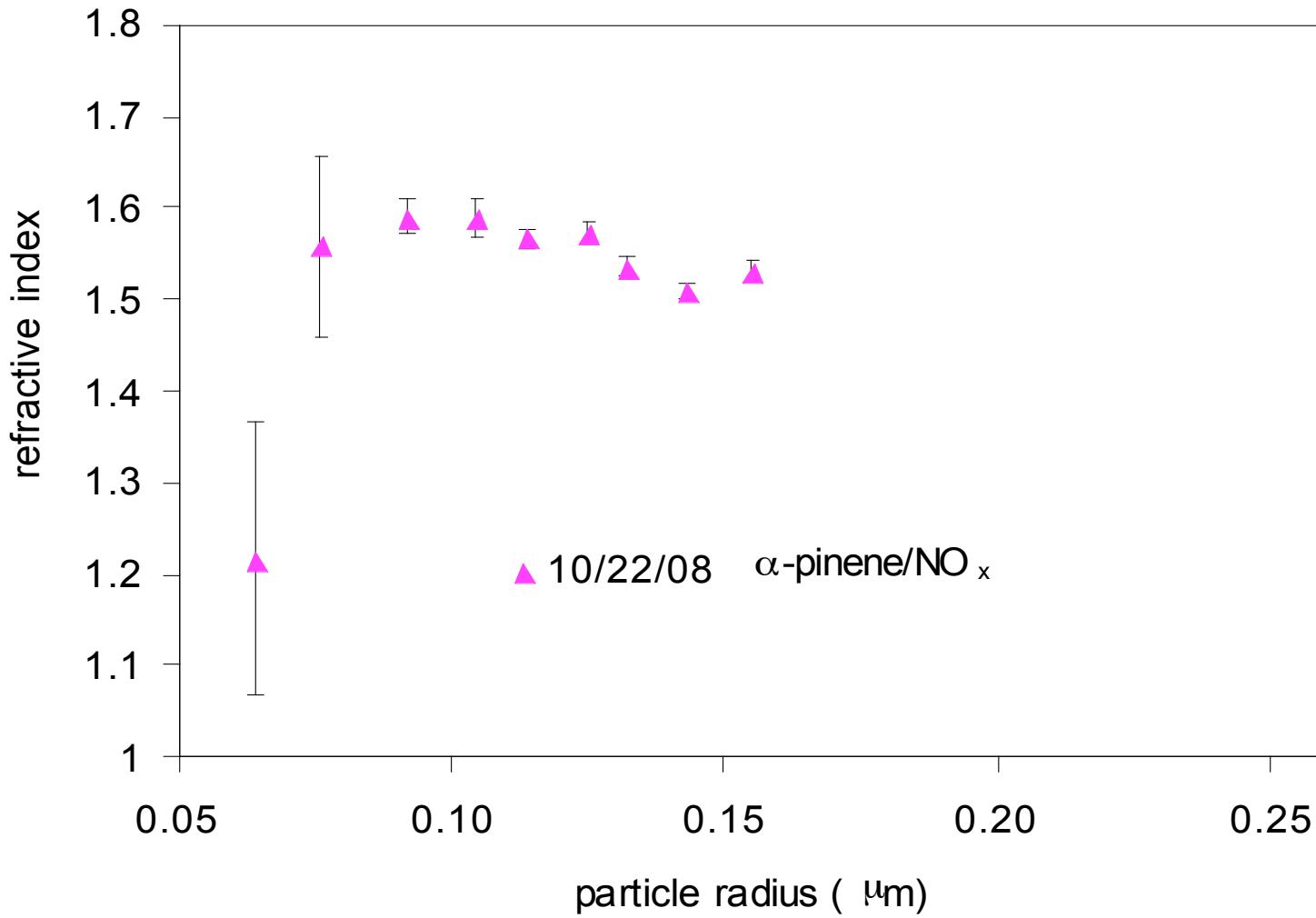
# Polar nephelometer measurements



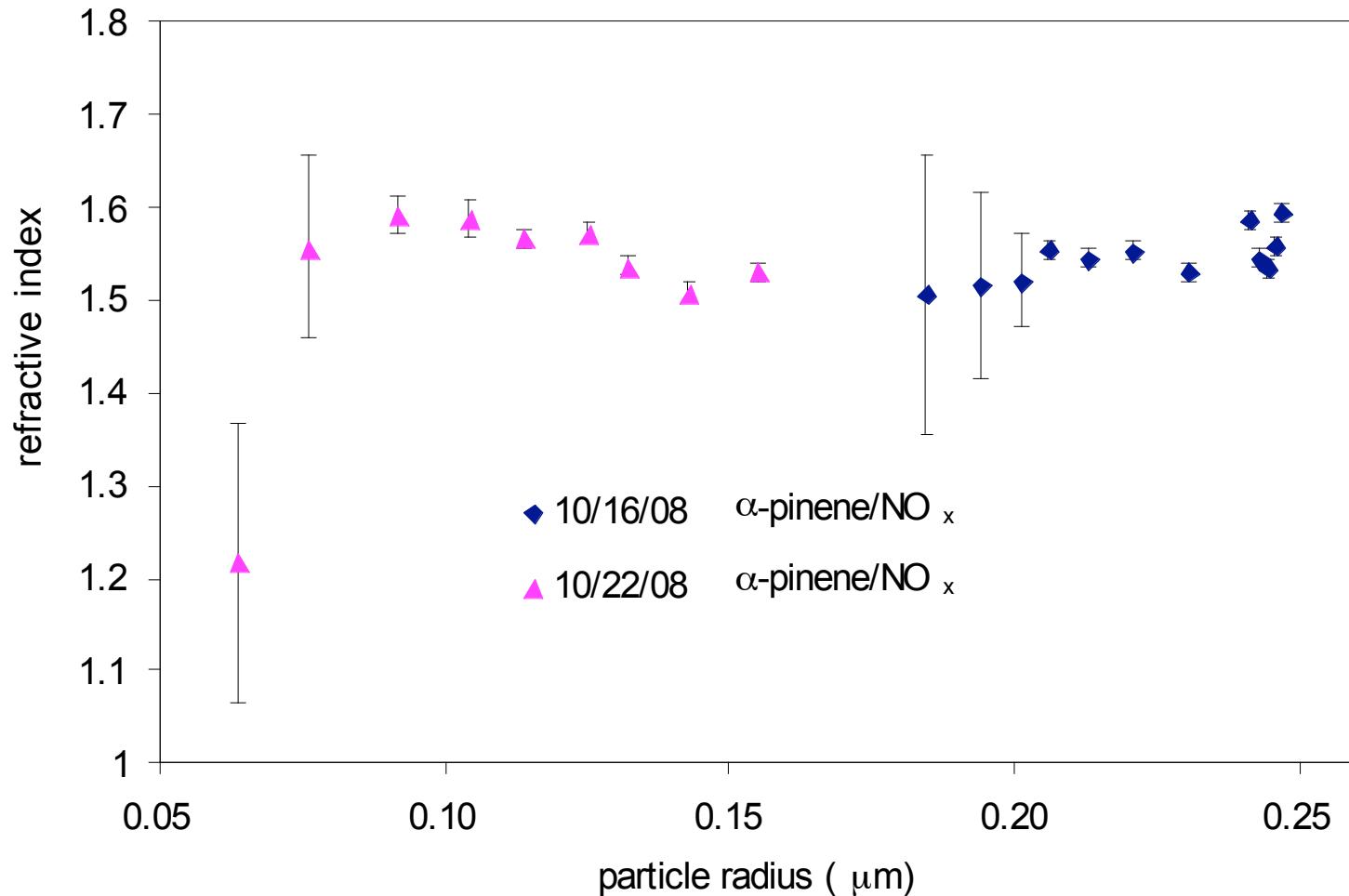
# GA determined refractive indicies



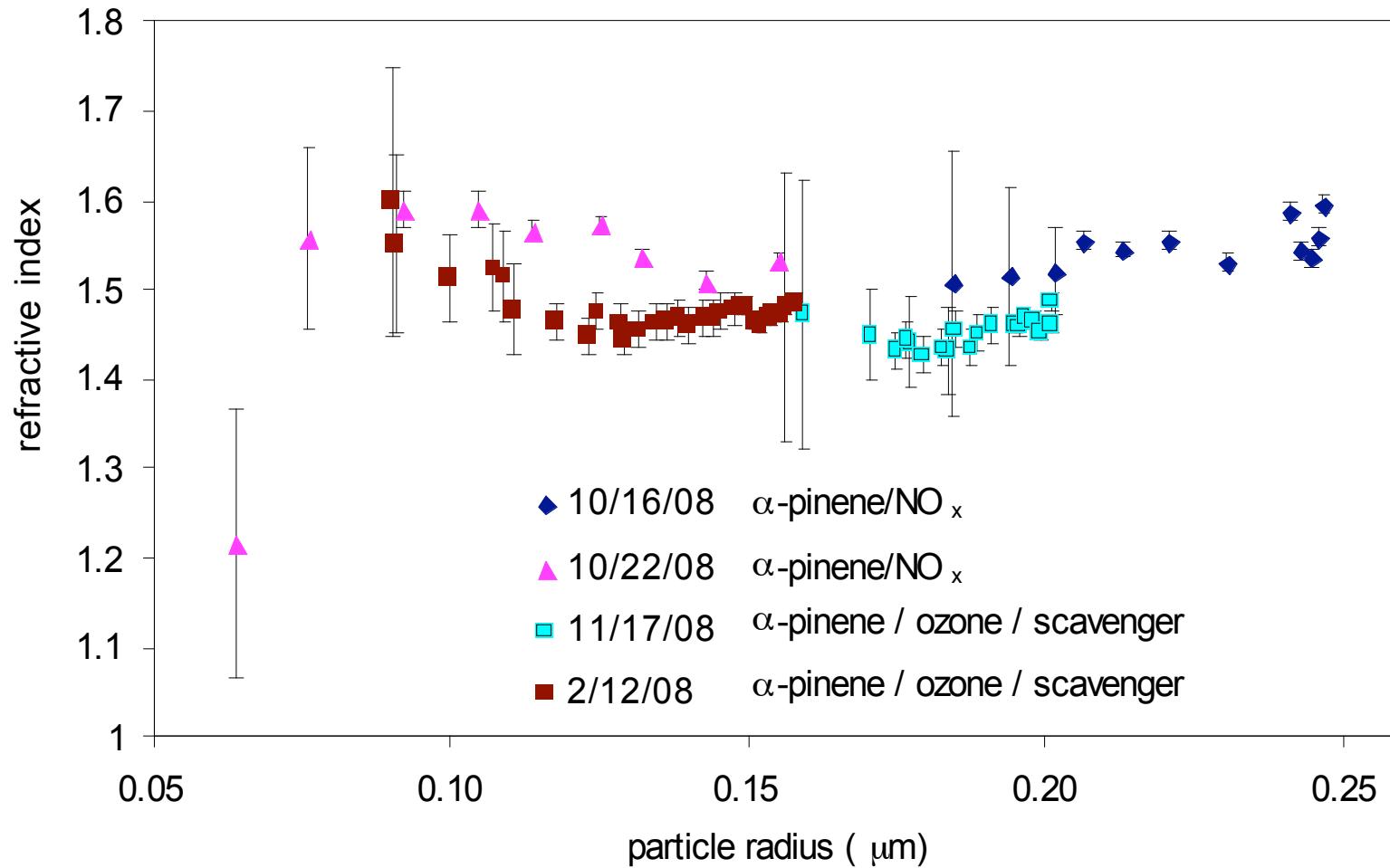
# Refractive indicies of different SOA



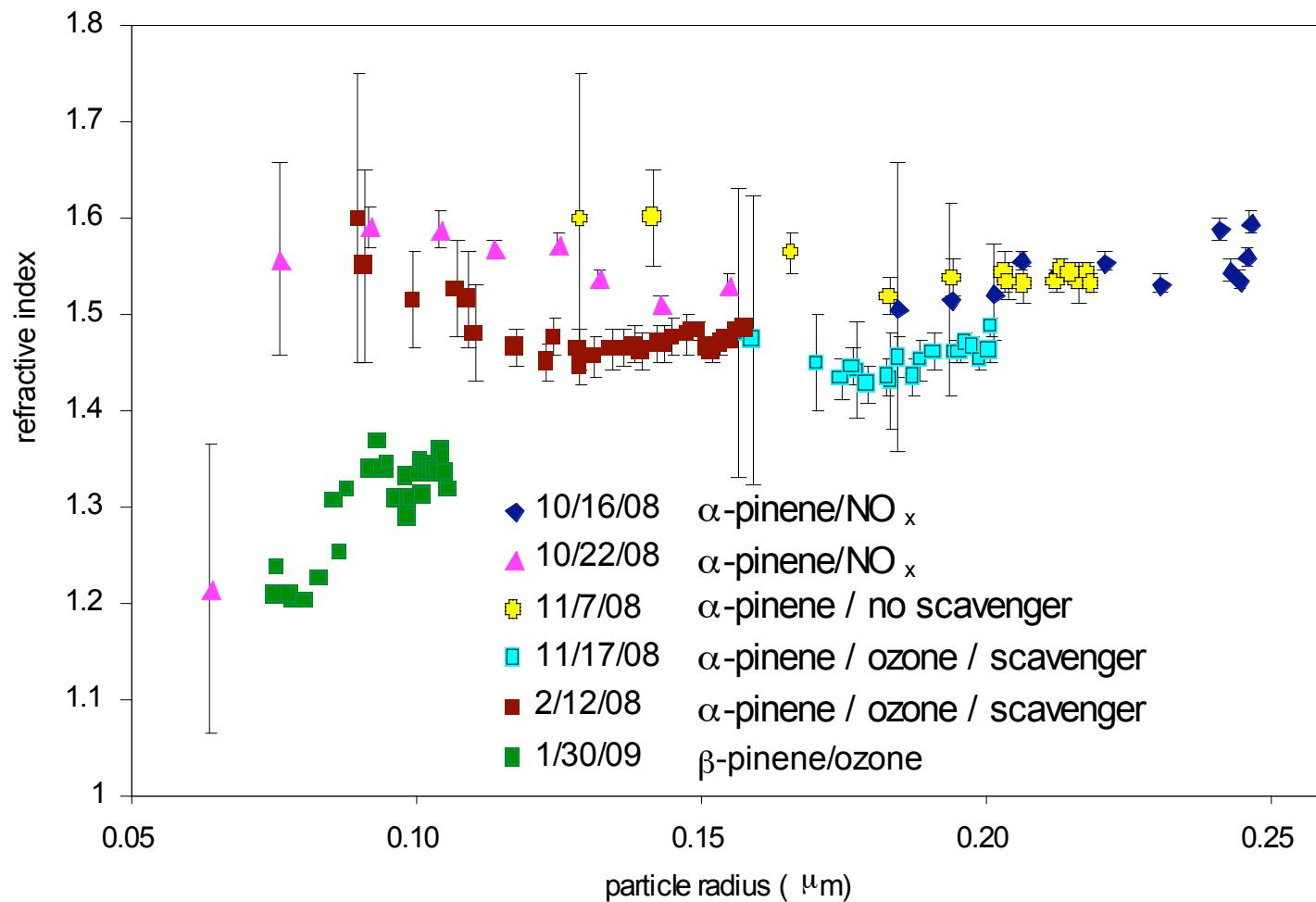
# Refractive indicies of different SOA



# Refractive indicies of different SOA



# Refractive indicies of different SOA



# Polar nephelometer measured asymmetry parameter

date	$m_r$	SMPS measured mean radius ( $\mu\text{m}$ )	SMPS measured standard deviation ( $\mu\text{m}$ )	$\langle g \rangle$ theoretical	$\langle g \rangle$ measured.
16-Oct	1.57	0.245	0.067	0.675	0.62
22-Oct	1.43	0.155	0.045	0.612	0.51
7-Nov	1.53	0.220	0.060	0.674	0.62
17-Nov	1.49	0.201	0.047	0.658	0.60
2-Dec	1.48	0.158	0.047	0.614	0.57

# Summary

- The  $m_r$  of SOA generated in our laboratory depends on the precursor composition and environmental conditions.
- Work on a direct measurement of  $\langle g \rangle$  directly from polar nephelometer measurements is ongoing.